

OCR A Level

Computer
Science

H446 – Paper 1

3

The nature of applications

Unit 2

Systems software
and applications
generation



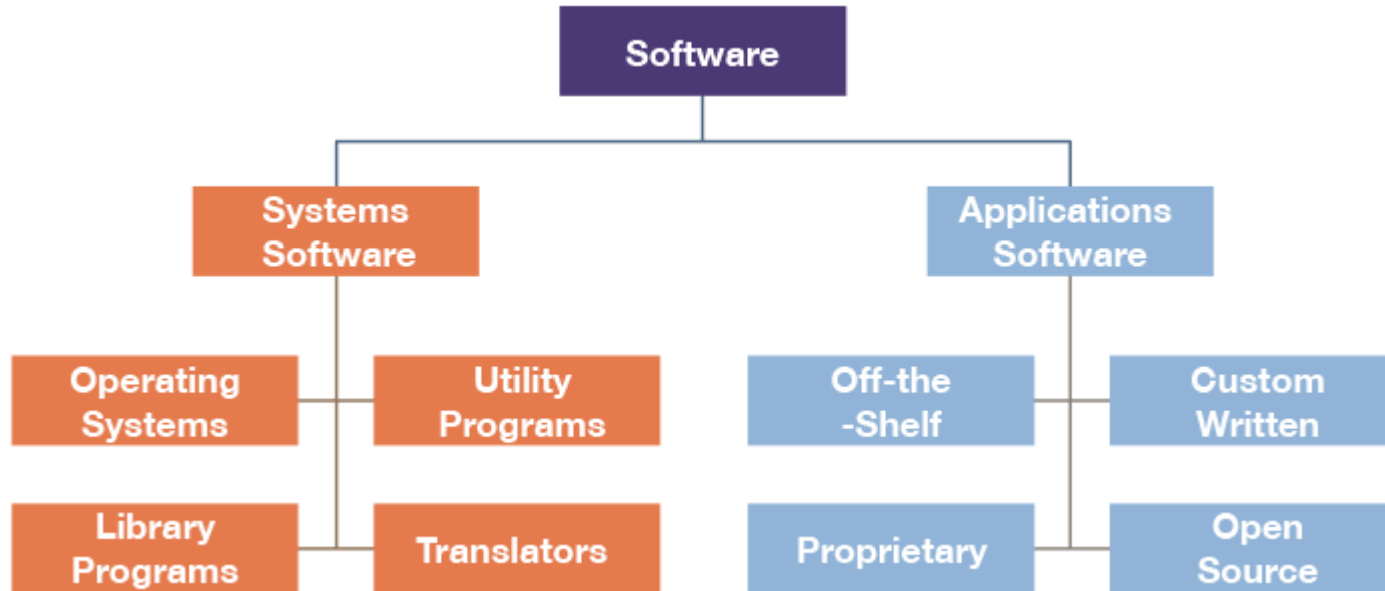
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Objectives

- Distinguish between systems software and applications software
- Describe what is meant by a utility program and give examples
- Be able to justify a suitable application for a specific purpose
- Distinguish between open source and closed source software

Categories of software

- Software can be grouped into several categories



Systems software

- Needed by the system to control hardware and run applications
 - Operating System
 - Utilities
 - Libraries
 - Translators

Operating System

- We have already discussed Operating Systems in detail in the previous topics
 - What is the purpose of the Operating System?



Operating System

- What is the purpose of the Operating System?
 - Provide a user interface
 - Handle memory management
 - Interrupt handling
 - Processor scheduling to provide 'multi-tasking'

Utility programs

- Utility programs optimise the performance of the computer and perform useful background tasks
 - Disk defragmenter
 - Automatic backup
 - Automatic updating
 - Virus checker
 - Compression software

Utility: Disk defragmenter

- Large files stored on a magnetic hard drive may be split up across several physical disk locations
- Disk defragmenter reorganises the hard drive so that files are in **sequential blocks** where possible
- The result is that files can be read more quickly
 - Why does the location of file data on a hard disk affect the speed of access?

Utility: Disk defragmenter

- Suppose files are stored in a section of the hard disk as follows:



- The defragmenter will try to ensure all parts of file A are contiguous by moving other files as necessary



- Why do you think gaps might be present in the first place?

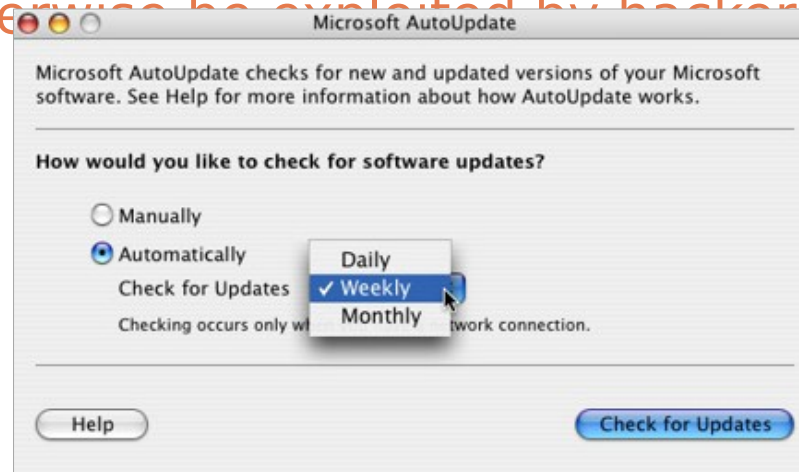


Utility: Automatic backup

- Data in permanent storage needs to be regularly backed up
 - Why might a business need to use backups?
- Users may forget to do this!
- The process can be automated, specifying:
 - Where** – portable hard drive, cloud, local server
 - When** – usually when the computer is not in use
 - What** – which data should be backed up
 - How** – should backups be compressed

Utility: Automatic updating

- Runs in the background detecting **software update** releases and automatically installing them
- Some updates add new software features
- Some important updates fix **security issues** which could otherwise be exploited by hackers



Windows automatic update

Update history

Cumulative Update for Windows 10 Version 1607 (KB3197954)

Successfully installed on 30/10/2016

Update for Windows 10 Version 1607 (KB3199986)

Successfully installed on 30/10/2016

Security Update for Adobe Flash Player for Windows 10 Version 1607 (KB3201860)

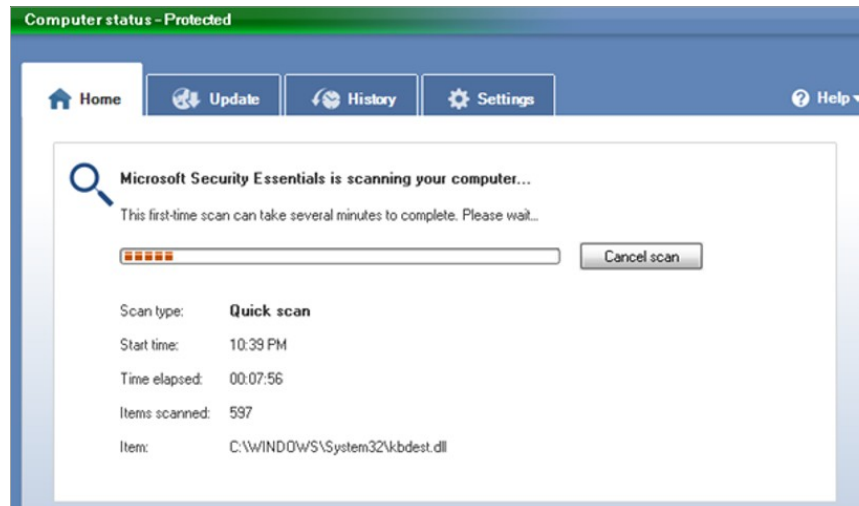
Successfully installed on 30/10/2016

Windows Malicious Software Removal Tool for Windows 8, 8.1 and 10 - October 2016 (KB890830)

Successfully installed on 12/10/2016

Utility: Virus checker

- Scans permanent storage for **viruses** by comparing files to known virus definitions
 - May also scan files 'on access' as they are opened
 - Must be kept up to date with new virus definitions to be effective



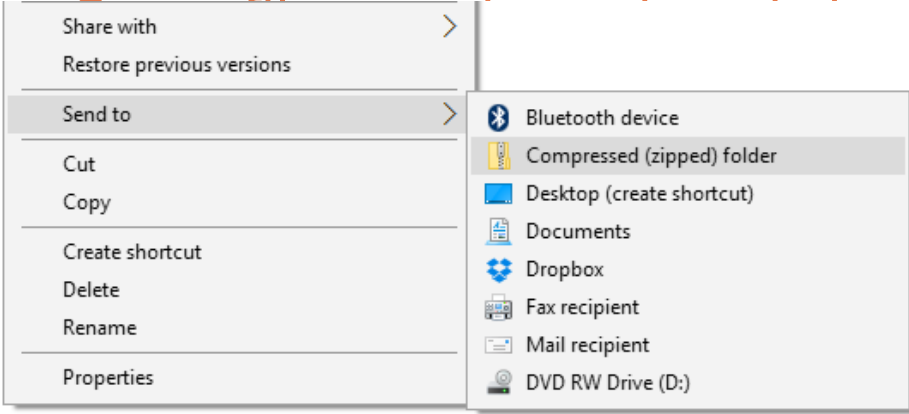
Utility: Virus checker

- Antivirus software uses **heuristics** – it knows what types of behaviour are likely to be used by a malicious program
- Heuristics can be used to guess which programs or files may contain a virus, based on their behaviour
- Sometimes the virus checker will flag a harmless file as a virus
 - **Why do you think this happens?**

Utility: Compression software

- We may want to send large files across the internet
- Compression software can reduce the size of files

ificantly in size and k this is?



My new book	08/06/2016 16:43	Microsoft Word 9...	389 KB
My new book	26/09/2016 12:02	Compressed (zipp...	139 KB

Worksheet

- Complete **Task 1** on **Worksheet 3**

Libraries and Translators

- Allow programs to use pre-written routines and to be translated into executable code
- Libraries and translators will be discussed in detail in Topic 4

Applications software

- Software that performs a task to benefit the user
- Applications can be divided into categories:
 - General purpose
 - Special purpose
 - Bespoke
- When we talk about 'apps' on a phone, this is just short for 'applications'!

Off the shelf or bespoke?

- Ready made software available to anyone to purchase is known as **off the shelf software**
 - This is true even if it didn't come from a physical shop!
- Software that is custom created for a specific user is known as **bespoke software**
- Bespoke software is mostly used by businesses rather than individuals

Open source software

- Open source software allows anyone to access its source code
- The software is open source **licensed** but free to use
- Anyone may **modify the software** and sell it, on the condition that the software produced is also open source
- Different from **freeware** - software that is free for anyone to use but the source code is not available

Closed source (proprietary)

- Closed source (or 'proprietary') software does not allow access to source code
- Users must pay the person or company who owns the copyright for a license to use the software
- There may be restrictions on how the software is used
 - e.g. it may only be licensed to be used by one person, on one machine, or on a particular physical site

Worksheet

- Complete **Task 2** on **Worksheet 3**

Selecting an application

- What criteria might you use when selecting an application to use?

Selecting an application

- **Functionality** – does it do what I want it to do?
- **Hardware** – will it run on the hardware?
- **Availability** – already exists or specially written?
- **Cost** – how much is it?
- **Reliability** – are there bugs, has it been tested?

Plenary

- Systems software is necessary for the system to operate
- Applications software performs tasks for the user
- Utility programs ensure the system runs smoothly
- Open source software allows free access to the software and its source code
- Closed source software requires users to pay for a licence and source code is hidden

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